

Amendments to the Claims:

Please amend Claims 1, 21, 31, and 51, as shown below. This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) An antenna, comprising:

a first antenna array, comprising:

one or more antenna elements of a first antenna element type in a first region of the first antenna array; and

a plurality of antenna elements of a second antenna element type in a second region of the first antenna array.
2. (Original) The antenna as recited in claim 1, wherein the first region of the first antenna array is a central region, and the second region of the first antenna array is a region outside of the central region.
3. (Original) The antenna as recited in claim 1, wherein the first antenna array comprises a spacecraft antenna mounted on a spacecraft bus.
4. (Original) The antenna as recited in claim 1, wherein the first antenna array comprises a deployed spacecraft antenna.
5. (Original) The antenna as recited in claim 1, wherein the first antenna element type comprises a helical antenna element, and the second antenna element type comprises a planar element type.

6. (Original) The antenna as recited in claim 1, wherein the first antenna element type comprises a helical antenna element type of a first length, and the second antenna element type comprises a helical antenna element of a second length.
7. (Original) The antenna as recited in claim 1, wherein the one or more antenna element of the first antenna element type are configured on a spacecraft bus, and the plurality of antenna elements of the second antenna element type are configured on one or more deployed panels.
8. (Original) The antenna as recited in claim 7, wherein the first antenna element type comprises a helical antenna element, and the second antenna element type comprises a planar antenna element.
9. (Original) The antenna as recited in claim 1, wherein the one or more antenna elements of the first antenna element type and the plurality of antenna elements of the second antenna element type are configured on a spacecraft bus, and wherein the first antenna array comprises a plurality of antenna elements of a third antenna element type configured on one or more deployed panels.
10. (Original) The antenna as recited in claim 9, wherein the first antenna element type comprises a helical antenna element, and the second antenna element type and the third antenna element type comprise planar antenna elements.
11. (Original) The antenna as recited in claim 9, wherein the first antenna element type comprises a helical antenna element of a first length, the second antenna element type comprises a helical antenna element of a second length, and the third antenna element type comprises a planar antenna element.
12. (Original) The antenna as recited in claim 1, further comprising a second antenna array comprising one or more antenna elements.

13. (Original) The antenna as recited in claim 12, wherein at least some of the one or more antenna elements of the second antenna array are of the first antenna element type.
14. (Original) The antenna as recited in claim 12, wherein at least some of the one or more antenna elements of the second antenna array are of the second antenna element type.
15. (Original) The antenna recited in claim 12, wherein the one or more antenna elements of the second antenna array comprise antenna elements of the first antenna element type and the second antenna element type.
16. (Original) The antenna as recited in claim 12, wherein the second antenna array has a coincident or overlapping frequency band as the first antenna array.
17. (Original) The antenna as recited in claim 12, wherein the one or more antenna elements of the second antenna array are interleaved with at least a portion of the antenna elements of the first antenna array.
18. (Original) The antenna as recited in claim 17, wherein the antenna elements of the first antenna array that are interleaved with the one or more antenna elements of the second antenna array are of the first antenna element type, and at least a portion of the antenna elements of the first antenna array that are not interleaved with the one or more antenna elements of the second antenna array are of the second antenna element type.
19. (Original) The antenna as recited in claim 12, wherein the antenna elements of the first antenna array and the one or more antenna elements of the second antenna array are configured on a spacecraft bus.
20. (Original) The antenna as recited in claim 12, wherein the one or more antenna elements of the first antenna element type of the first antenna array and the one or more antenna elements of the

second antenna array are configured on a spacecraft bus, and the plurality of antenna elements of the second antenna element type of the first antenna array are configured on one or more deployed panels.

21. (Currently Amended) The antenna as recited in claim 20, wherein the one or more antenna elements of the first antenna element type of the first antenna array and the one or more antenna elements of the second antenna array are interleaved, and wherein the first antenna element type of the first antenna array comprises a helical antenna element, the second antenna element type comprises a planar antenna element, and the one or more antenna elements of the second antenna array comprise helical antenna elements.

22. (Original) The antenna as recited in claim 12, wherein the one or more antenna elements of the first antenna element type of the first antenna array, the plurality of antenna elements of the second antenna element type of the first antenna array, and the one or more antenna elements of the second antenna array are configured on a spacecraft bus, and wherein the first antenna array comprises a plurality of antenna elements of a third antenna element type configured on one or more deployed panels.

23. (Original) The antenna as recited in claim 22, wherein the first antenna element type comprises a helical antenna element, the second antenna element type and the third antenna element type comprise planar antenna elements, and the one or more antenna elements of the second antenna array comprise helical antenna elements.

24. (Original) The antenna as recited in claim 22, wherein the first antenna element type comprises a helical antenna element of a first length, the second antenna element type comprises a helical antenna element of a second length, the one or more antenna elements of the second antenna

array comprise helical antenna elements of a third length, and the third antenna element type comprises a planar antenna element.

25. (Original) The antenna as recited in claim 24, wherein the first length, the second length and the third length may all be different lengths, or two or more of the first length, the second length and the third length may be the same length.

26. (Original) The antenna as recited in claim 12, wherein the first antenna array comprises a Navigation Warfare Global Positioning System antenna.

27. (Original) The antenna as recited in claim 12, wherein the second antenna array comprises a Earth Coverage Global Positioning System antenna.

28. (Original) The antenna array as recited in claim 12, wherein at least one of the first antenna array and the second antenna array comprises a phased array antenna.

29. (Original) The antenna array as recited in claim 12, wherein at least one of the first antenna array and the second antenna array comprises an active phased array antenna.

30. (Original) The antenna as recited in claim 12, further comprising a third antenna array comprising one or more antenna elements.

31. (Currently Amended) A spacecraft, comprising:

a spacecraft bus; and

a first antenna array, comprising:

one or more antenna elements of a first antenna element type in a first region of the first antenna array; and

a plurality of antenna elements of a second antenna element type in a second region of the first antenna array.

32. (Original) The spacecraft as recited in claim 31, wherein the first region of the first antenna array is a central region, and the second region of the first antenna array is a region outside of the central region.

33. (Original) The spacecraft as recited in claim 31, wherein the first antenna array comprises a spacecraft antenna mounted on a spacecraft bus.

34. (Original) The spacecraft as recited in claim 31, wherein the first antenna array comprises a deployed spacecraft antenna.

35. (Original) The spacecraft as recited in claim 31, wherein the first antenna element type comprises a helical antenna element, and the second antenna element type comprises a planar element type.

36. (Original) The spacecraft as recited in claim 31, wherein the first antenna element type comprises a helical antenna element type of a first length, and the second antenna element type comprises a helical antenna element of a second length.

37. (Original) The spacecraft as recited in claim 31, wherein the one or more antenna elements of the first antenna element type are configured on a spacecraft bus, and the plurality of antenna elements of the second antenna element type are configured on one or more deployed panels.

38. (Original) The spacecraft as recited in claim 37, wherein the first antenna element type comprises a helical antenna element, and the second antenna element type comprises a planar antenna element.

39. (Original) The spacecraft as recited in claim 31, wherein the one or more antenna elements of the first antenna element type and the plurality of antenna elements of the second antenna element type are configured on a spacecraft bus, and wherein the first antenna array comprises a

plurality of antenna elements of a third antenna element type configured on one or more deployed panels.

40. (Original) The spacecraft as recited in claim 39, wherein the first antenna element type comprises a helical antenna element, and the second antenna element type and the third antenna element type comprise planar antenna elements.

41. (Original) The spacecraft as recited in claim 39, wherein the first antenna element type comprises a helical antenna element of a first length, the second antenna element type comprises a helical antenna element of a second length, and the third antenna element type comprises a planar antenna element.

42. (Original) The spacecraft as recited in claim 31, further comprising:
a second antenna array comprising one or more antenna elements.

43. (Original) The spacecraft as recited in claim 42, wherein at least some of the one or more antenna elements of the second antenna array are of the first antenna element type.

44. (Original) The spacecraft as recited in claim 42, wherein at least some of the one or more antenna elements of the second antenna array are of the second antenna element type.

45. (Original) The spacecraft as recited in claim 42, wherein at least some of the one or more antenna elements of the second antenna array comprise antenna elements of the first antenna element type and the second antenna element type.

46. (Original) The spacecraft as recited in claim 42, wherein the second antenna array has a coincident or overlapping frequency band as the first antenna array.

47. (Original) The spacecraft as recited in claim 42, wherein the one or more antenna elements of the second antenna array are interleaved with at least a portion of the antenna elements of the first antenna array.

48. (Original) The spacecraft as recited in claim 47, wherein the antenna elements of the first antenna array that are interleaved with the one or more antenna elements of the second antenna array are of the first antenna element type, and at least a portion of the antenna elements of the first antenna array that are not interleaved with the one or more antenna elements of the second antenna array are of the second antenna element type.

49. (Original) The spacecraft as recited in claim 42, wherein the antenna elements of the first antenna array and the one or more antenna elements of the second antenna array are configured on a spacecraft bus.

50. (Original) The spacecraft as recited in claim 42, wherein the one or more antenna elements of the first antenna element type of the first antenna array and the one or more antenna elements of the second antenna array are configured on a spacecraft bus, and the plurality of antenna elements of the second antenna element type of the first antenna array are configured on one or more deployed panels.

51. (Currently Amended) The spacecraft as recited in claim 50, wherein the one or more antenna elements of the first antenna element type of the first antenna array and the one or more antenna elements of the second antenna array are interleaved, and wherein the first antenna element type of the first antenna array comprises a helical antenna element, the second antenna element type comprises a planar antenna element, and the one or more antenna element of the second antenna array comprise helical antenna elements.

52. (Original) The spacecraft as recited in claim 42, wherein the one or more antenna elements of the first antenna element type of the first antenna array, the plurality of antenna elements of the second antenna element type of the first antenna array, and the one or more antenna elements of the second antenna array are configured on a spacecraft bus, and wherein the first antenna array comprises a plurality of antenna elements of a third antenna element type configured on one or more deployed panels.

53. (Original) The antenna as recited in claim 52, wherein the first antenna element type comprises a helical antenna element, the second antenna element type and the third antenna element type comprise planar antenna elements, and the one or more antenna elements of the second antenna array comprise helical antenna elements.

54. (Original) The antenna as recited in claim 52, wherein the first antenna element type comprises a helical antenna element of a first length, the second antenna element type comprises a helical antenna element of a second length, the one or more antenna elements of the second antenna array comprise helical antenna elements of a third length, and the third antenna element type comprises a planar antenna element.

55. (Original) The antenna as recited in claim 54, wherein the first length, the second length and the third length may all be different lengths, or two or more of the first length, the second length and the third length may be the same length.

56. (Original) The spacecraft as recited in claim 42, wherein the first antenna array comprises a Navigation Warfare Global Positioning System antenna.

57. (Original) The spacecraft as recited in claim 42, wherein the second antenna array comprises a Earth Coverage Global Positioning System antenna.

58. (Original) The spacecraft as recited in claim 42, wherein at least one of the first antenna array and the second antenna array comprises a phased array antenna.

59. (Original) The spacecraft as recited in claim 42, wherein at least one of the first antenna array and the second antenna array comprises an active phased array antenna.

60. (Original) The spacecraft as recited in claim 42, further comprising a third antenna array comprising one or more antenna elements.